

- If you are viewing this course as a recorded course after the live webinar, you can use the scroll bar at the bottom of the player window to pause and navigate the course.
- This handout is for reference only. Non-essential images have been removed for your convenience. Any links included in the handout are current at the time of the live webinar, but are subject to change and may not be current at a later date.

No part of the materials available through the continued.com site may be copied, photocopied, reproduced, translated or reduced to any electronic medium or machine-readable form, in whole or in part, without prior written consent of continued.com, LLC. Any other reproduction in any form without such written permission is prohibited. All materials contained on this site are protected by United States copyright law and may not be reproduced, distributed, transmitted, displayed, published or broadcast without the prior written permission of continued.com, LLC. Users must not access or use for any commercial purposes any part of the site or any services or materials available through the site.

## Technical issues with the Recording?

- Clear browser cache using [these instructions](#)
- Switch to another browser
- Use a hardwired Internet connection
- Restart your computer/device

## Still having issues?

- Call 800-753-2160 (M-F, 8 AM-8 PM ET)
- Email [customerservice@AudiologyOnline.com](mailto:customerservice@AudiologyOnline.com)

**CONTINUED**

# The Technological Evolution of Today's Hearing Aids

David Kemp  
Oaktree Products  
Future Ear (FuturEar.co)



**CONTINUED**

# Update to Last Year's Talk

## Connectivity and Future Hearing Aid Applications

Course #31881 | Level: Introductory | 1 Hour | ★★★★★ 206 Reviews

This course goes through the current state of hearing aid applications and connectivity innovation and explores what's on the horizon for Bluetooth hearing aids and the expanding use cases that they'll possibly support. This course will cover ancillary industries and the innovation transpiring within them, and explore how that innovation may bleed into our industry.

Course created on October 9, 2016

Hearing Aids - Adults

Preview Exam

**Presented By**

Dave Kemp  
Manager of Business Development & Marketing, Oaktree Products



Dave Kemp is the Manager of Business Development & Marketing at Oaktree Products. He graduated from the University of Kansas in 2012 with a BA in Journalism. Prior to joining



## Oaktree Products



- Bob & Margy Kemp started company in 1992
- Largest supplier of clinical supplies to the audiology industry
- We differentiate on service and serving as a resource to the industry via educational materials, presentations at industry trade shows, and webinars.



## Future Ear



- Blog I launched in 2017 – “Connecting the Trends Converging around the Ear”
- One blog post per day, Monday - Friday
- Goal: Aggregate & distill all the information relating to technological innovation pertinent to the busy hearing care professional



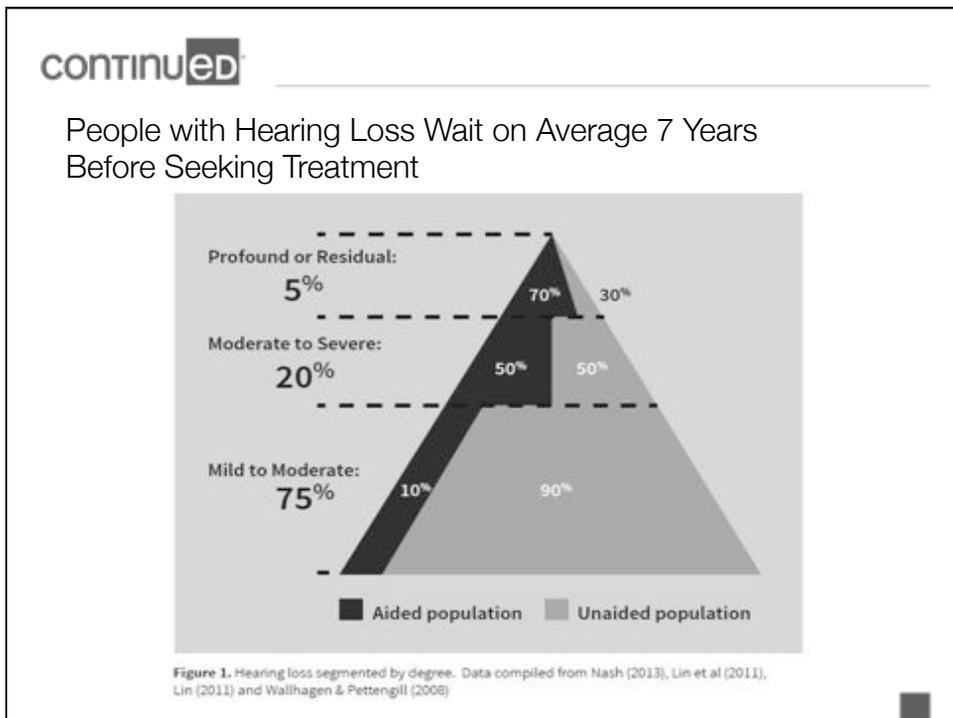
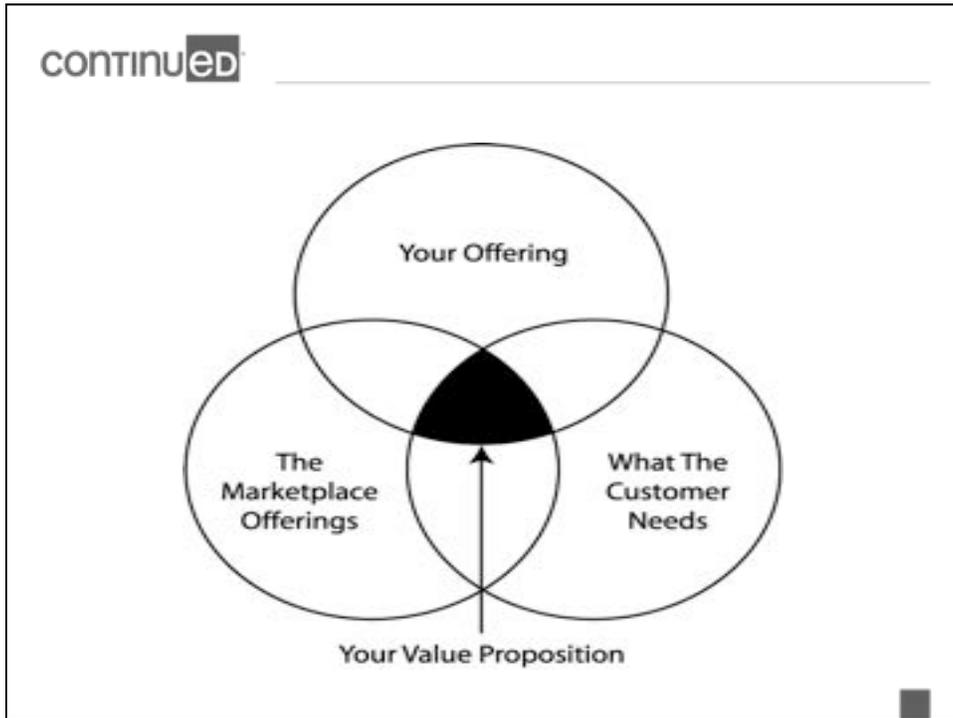
## Learning Outcomes

After this course, participants will be able to:

- Describe to colleagues and business partners the ways in which hearing aids are becoming smarter and more capable.
- Discuss new features and capabilities available in today's hearing aids.
- Describe what type of hearing aid functionality to expect in the near and long term.

## Understand your Value

- “Hearing care professionals lamenting the dwindling average selling price for their “products” must recognize the increasing rarity, and hence high value, of trust in the provision of knowledgeable assistance.”  
- H. Christopher Scheitzer, PHD – Hearing Review



## Today's Agenda

- How to Kill the Negative Stigma Surrounding Hearing Aids
  - Normalization & Popularization
    - The booming hearables market
  - Increasing the Functionality & The Cool Factor
    - The Aural Attention Economy & VoiceFirst
  - The Transformation into a Life-Saving Device
    - Biometrics, Preventative Health, and the Longevity Economy

## How to Kill a Negative Stigma: Normalization & Popularization

CONTINUED

## How to Define “Hearables”

Wearables = Body Worn  
Computers

Hearables = Ear Worn  
Computers

CONTINUED

## How to Define “Hearables”

According to the International Data Center (IDC) Hearables are defined as wearables that hang on or plug into the ear. The device must operate wirelessly and provide stereo sound while also including at least one of the following features:

- Track health/fitness (e.g., Samsung Gear IconX)
- Modify audio, and not just noise reduction (e.g., Nuheara IQbuds)
- Provide language translation on the device (e.g., Waverly Labs)
- Enable smart assistants at the touch of a button or through hotword detection even if the assistant is running on another device such as a smartphone (e.g., Apple's AirPods and Google's Pixel Buds)

CONTINUED

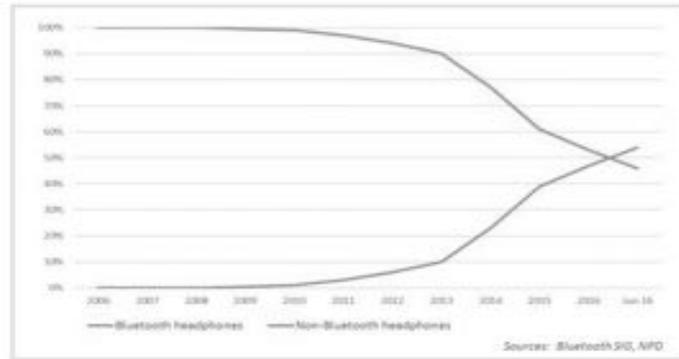
## Recent Component Innovation Happening *\*Inside\** the Devices

- Sonova SWORD Chip: Can support 5 Bluetooth protocols
- Digital Signal Processing (DSP) Chips: Qualcomm QC5100 Series one of the most sophisticated hearable chip architectures. Allows for increasingly lower power consumption. Can now integrate Active Noise Cancellation directly into the chip.
- Apple's H1 Chip – Hearable chip. Allows for hearable-specific functionality: "Hey Siri"

## The Bluetooth Shift

- February 2014 – Resound introduces first MFi (made for iPhone) hearing aid – The Linx
  - All 5 Major Hearing Aid Manufacturers now offer one or more MFi hearing aid
- September 2019 – Android releases Android 10 operating system which includes Android Streaming for Hearing Aids (ASHA) low-power Bluetooth protocol
  - Currently only available for Google Pixel phones but will eventually become available for Android smartphones
- 94% of hearing aids sold in Q3 2019 had wireless capabilities (HIA)

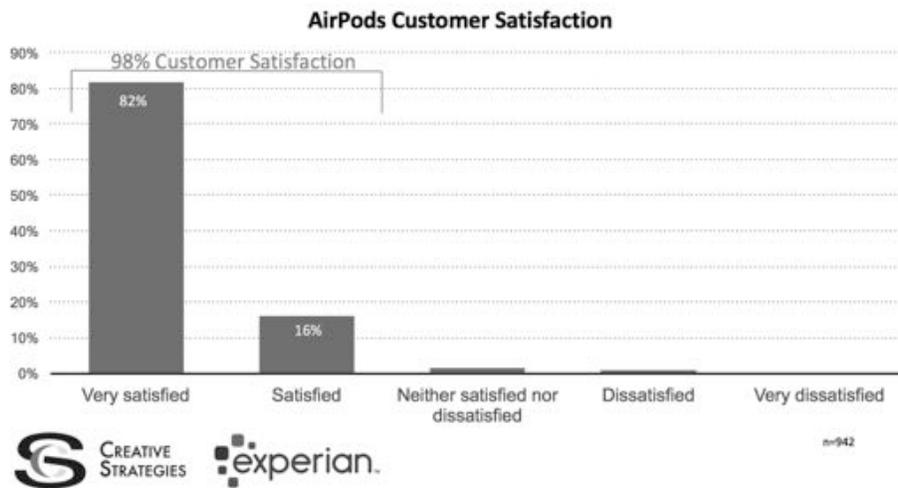
## The Bluetooth Shift

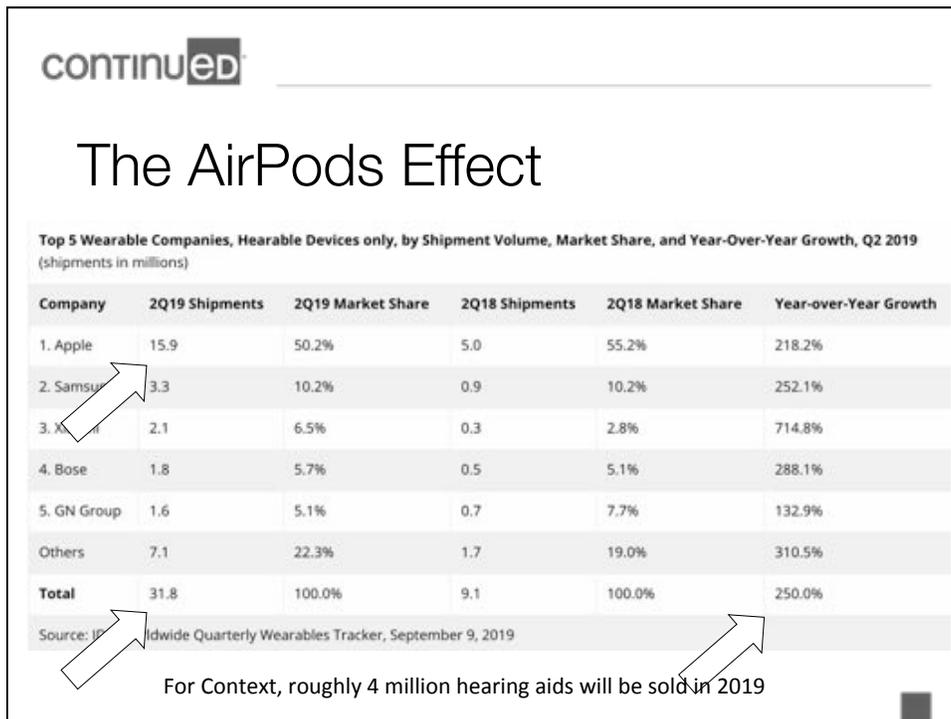


From Nick Hurn's *The Market for Hearables 2016-2020*

- Apple removes headphone jack in iPhone 7, September 2016

## The AirPods Effect





**continued**

## The Tech Giants Enter the Hearables Arena

- Samsung Galaxy Buds
- Release Date: March 8<sup>th</sup>, 2019
- Have grown to capture 10% of the hearable market share in less than a year
- Largely aided by being included with purchase of Samsung Galaxy S10



CONTINUED

## The Tech Giants Enter the Hearables Arena

- Amazon Echo Buds
- Release Date: October 30<sup>th</sup>, 2019
- Include Active Noise Cancellation, Pass-Through Audio, and will retail for \$129
- Tap for Alexa access



CONTINUED

## The Tech Giants Enter the Hearables Arena

- Microsoft Surface Buds
- Release Date: Due out Later this Year
- Large focus on enterprise applications & voice assistant capabilities



CONTINUED

CONTINUED

## The Tech Giants Enter the Hearables Arena

- Google Pixel Buds 2.0
- Release Date: Spring 2020
- Google's second version of Pixel Buds
- Major emphasis on Google Assistant integration and sweat/water resistance



CONTINUED

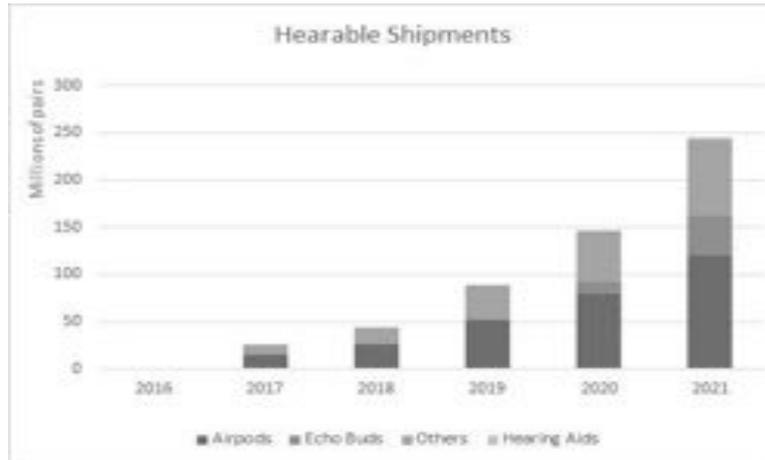
## AirPods Pro

- Release Date: Oct.30
- Price: \$249
- Key Features: Active Noise Cancellation & Pass Through Audio (can be toggled with Force Sensor on the stem of AirPods); sweat & water resistant (light rain); H1 Chip – Apple's hearable-specific chip "Hey Siri"



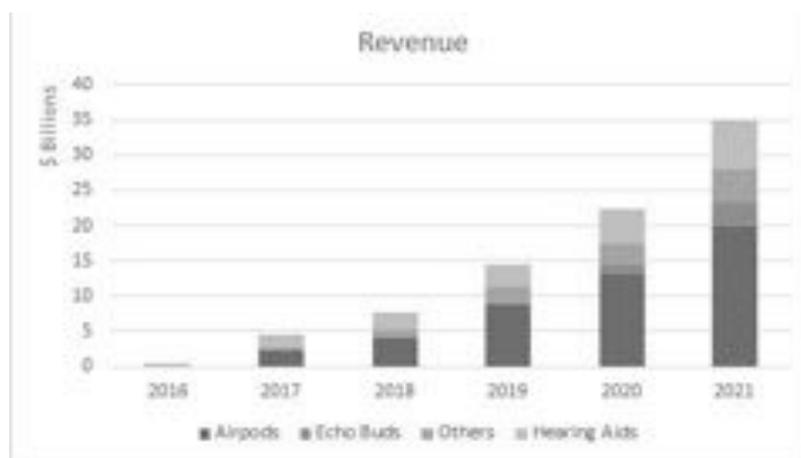
CONTINUED

## The Hearables Explosion



• From Nick Hunn's "Will Echo Buds Challenge AirPods?"

## Bluetooth Hearing Aid Takeover



• From Nick Hunn's "Will Echo Buds Challenge AirPods?"

CONTINUED

## Today's Hearing Aid Testimonial

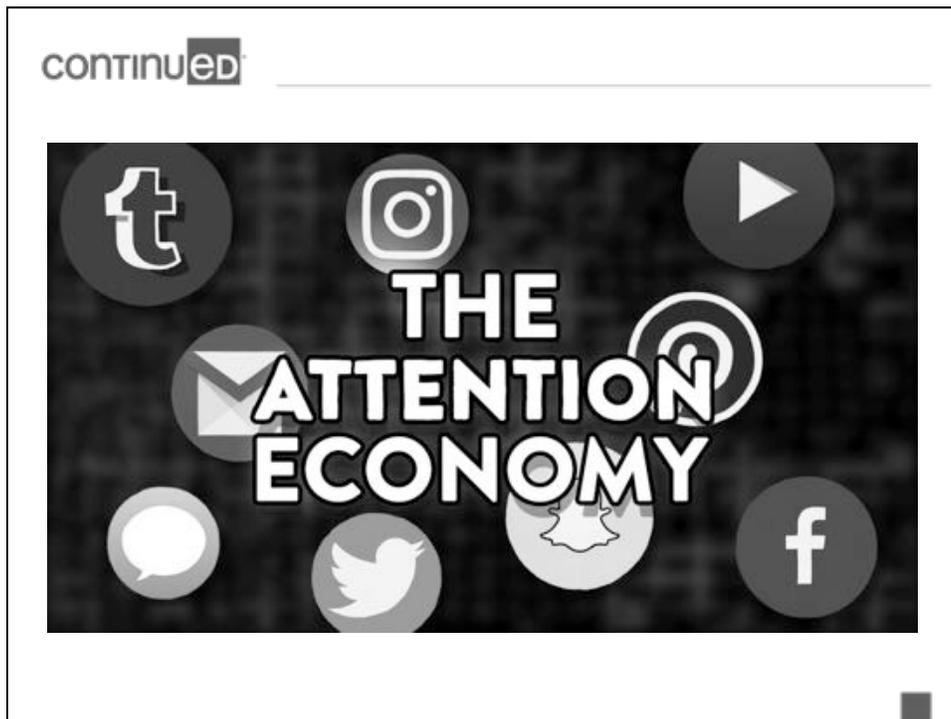
I asked a hearing aid wearer (male, 59 years old), who recently started wearing hearing aids about his experience so far. His answer:

Like many others, I waited until my hearing loss became severe before taking the plunge. My hearing is now so much improved that I regret not getting fitted sooner. The most surprising thing is that I find myself less fatigued at the end of the day because my brain has not been working overtime trying to decode speech. Aside from mitigating my hearing loss, the hearable features of modern hearing aids are also a plus. **I travel for work and either make calls or participate in internet meetings often enough that being able to connect them to my phone, tablet, or computer was most important. For that reason I chose a model with universal Bluetooth connectivity.** I'm on the younger end of the spectrum so health monitoring and biometrics were less important to me personally, though those features can be life-changing for others in different circumstances. My hearing aids are not a burden to wear and they improve my quality of life in multiple ways.

CONTINUED

## How to Kill a Negative Stigma: Increasing the Functionality & Cool Factor

CONTINUED



CONTINUED

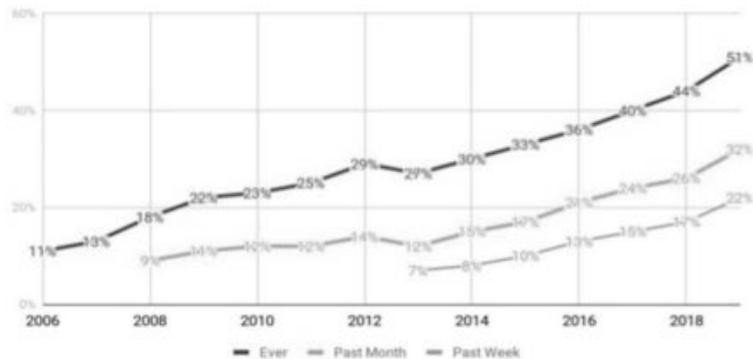
## The Aural Attention Economy

“To really understand, take the current value of the video industry. Consumers spend roughly the same amount of time on video as they do on audio. Video is about a trillion dollar market. And the music and radio industry is worth around a hundred billion dollars. I always come back to the same question: Are our eyes really worth 10 times more than our ears? I firmly believe this is not the case. For example, people still spend over two hours a day listening to radio — and we want to bring that radio listening to Spotify, where we can deepen engagement and create value in new ways. With the world focused on trying to reduce screen time, it opens up a massive audio opportunity.” – Daniel Ek, Spotify CEO

CONTINUED

## The Aural Attention Economy

Percentage of Americans (12+) listening to podcasts



Source: Edison Research & Triton Digital via CB Insights

CONTINUED

## The Aural Attention Economy

- According to a 2018 report from Edison Research and Triton Digital:
  - Average weekly podcast consumption is 3 hours and 37 minutes
  - On average, Americans listen to 7 episodes per week
- This is a brand new medium:
  - “If you think of audio as the way you would, say, film, like we’re still in the black-and-white period of podcasting. What’s the ‘color’ going to look like?” – Sean Rameswaram, host of *Today, Explained* podcast

CONTINUED



## Today's Hearing Aid Testimonial

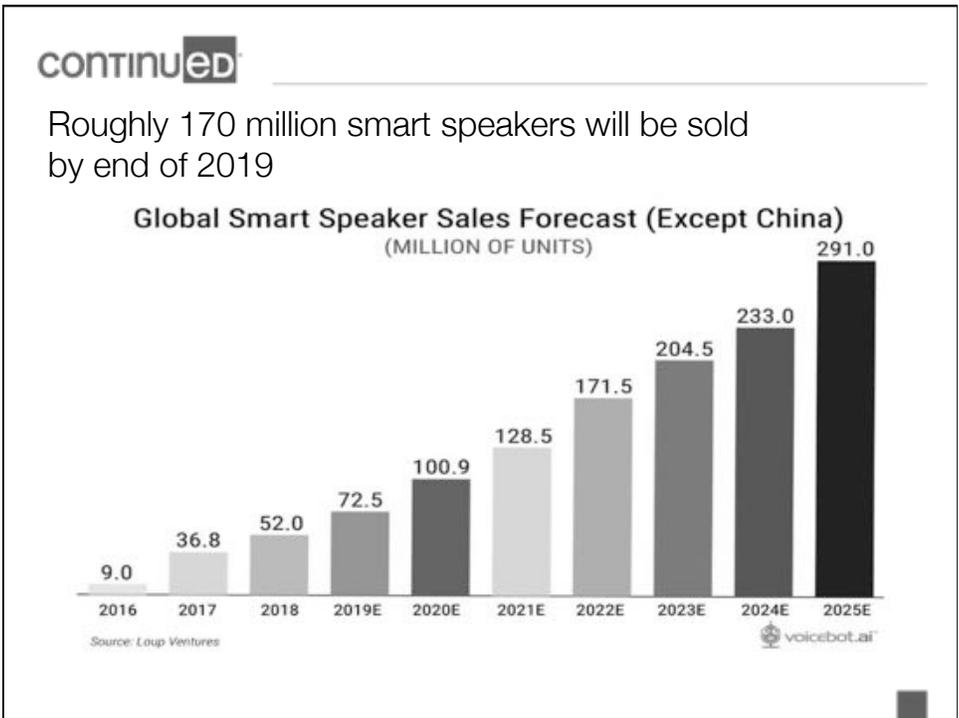
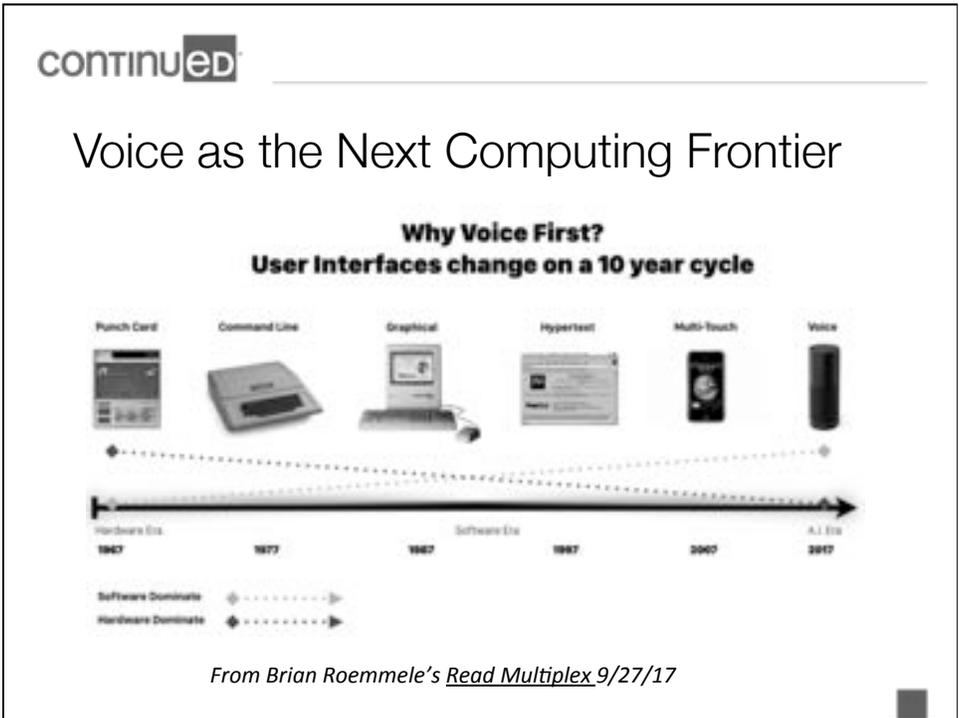
I asked one lifetime hearing aid wearer (male 28 years old), if his podcast consumption has increased over time via his Bluetooth hearing aids. His answer:

“Oh man, definitely increased. I'll get up, maybe throw on a pod while I make coffee and get ready. Then I'll stream a guided meditation. I'll listen to a pod or audiobook for about 35 minutes while I walk to work. At work throughout the day I might listen to 30-60 minutes of music while I'm doing reports or admin stuff. I'll usually listen to a podcast or book during lunch when I go for a walk, then I'll walk home and listen to something for another 35 minutes. If I'm making supper I'll usually have something playing as well.”



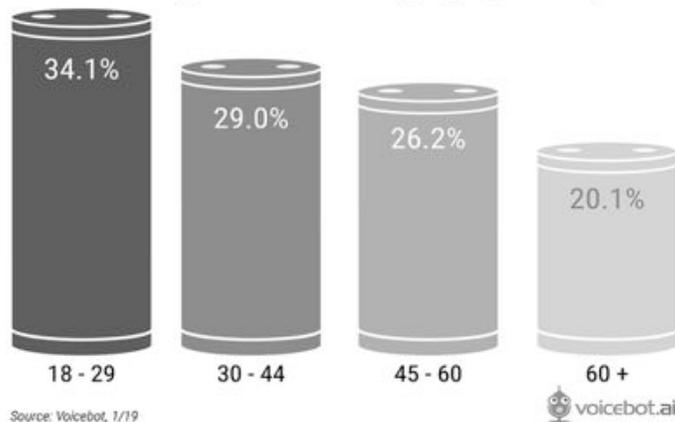
## Practical Applications – Podcasts & Audiobooks





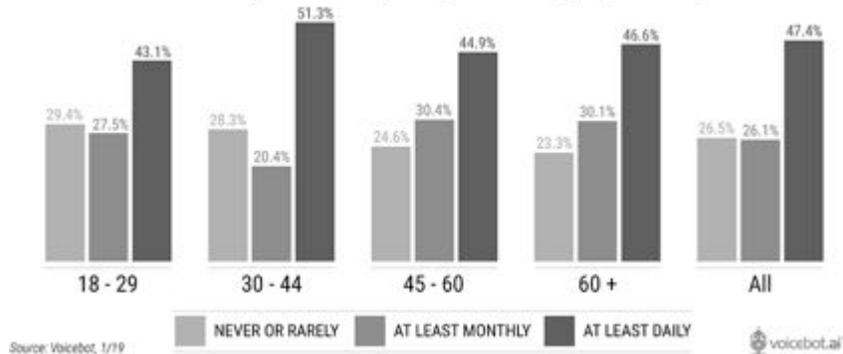
Roughly 34 million older adults own a smart speaker

Smart Speaker Ownership by Age Group



Therefore, about 17 million older adults use a smart speaker at least once per day.

Smart Speaker Frequency of Use by Age Group

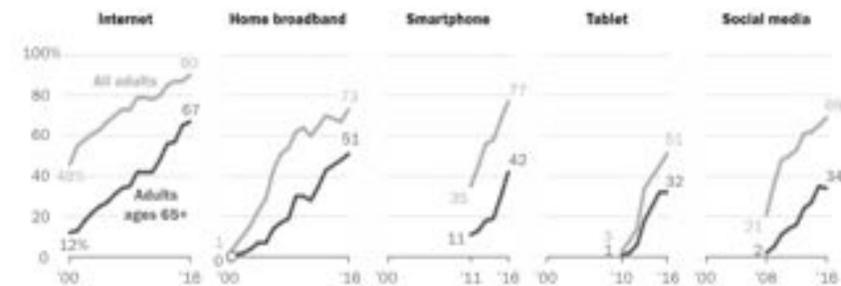


CONTINUED

## Adults 65+ Rapid Adoption of Technology

### Smartphone adoption among seniors has nearly quadrupled in the last five years

% of U.S. adults who say they have or use the following



Source: Survey conducted Sept. 29–Nov. 6, 2016. Trend data are from previous Pew Research Center surveys. "Tech Adoption Diminishes Among Older Adults"

PEW RESEARCH CENTER

CONTINUED

## Amazon's Intense Focus on Alexa

- "It's the first inning. It might even be the first guys up at bat. We're on the edge of the golden age [of AI]." – Jeff Bezos, May 2016 at Recode

TECH | CONSUMER TECHNOLOGY

### Amazon Says It Has Over 10,000 Employees Working on Alexa, Echo

Number of employees doubles the staff in that division a little more than a year ago

WSJ – November 2018

CONTINUED

## Amazon's Intense Focus on Alexa

- In December of 2018, after Amazon just closed its biggest quarter and year in history, Jeff Bezos' only quote from the earnings call focused on one topic only: Alexa.
- "Alexa was very busy during her holiday season. Echo Dot was the best-selling item across all products on Amazon globally, and customers purchased millions more devices from the Echo family compared to last year. The number of research scientists working on Alexa has more than doubled in the past year, and the results of the team's hard work are clear. In 2018, we improved Alexa's ability to understand requests and answer questions by more than 20% through advances in machine learning, we added billions of facts making Alexa more knowledgeable than ever, developers doubled the number of Alexa skills to over 80,000, and customers spoke to Alexa tens of billions more times in 2018 compared to 2017. We're energized by and grateful for the response, and you can count on us to keep working hard to bring even more invention to customers."

transition of Prime from two days to one day — they've already ordered billions of items with free one-day delivery this year. It's a big investment, and it's the right long-term decision for customers. And although it's counterintuitive, the fastest delivery speeds generate the least carbon emissions because these products ship from fulfillment centers very close to the customer — it simply becomes impractical to use air or long ground routes. Huge thanks to all the teams helping deliver for customers this holiday."

### Highlights

- Amazon introduced an all-new line up of Echo devices: the next generation Echo, Echo Dot with clock, Echo Show 8, Echo Buds, Echo Flex, and Echo Studio. Additionally, Amazon announced Day 1 Editions, a new program designed to bring innovative ideas to customers faster — starting with Echo Frames, all-day glasses with Alexa, and Echo Loop, an Alexa-enabled smart ring.
- Amazon announced over 20 new Fire TV products, including the first Fire TV Edition soundbar, the all-new Fire TV Cube, the fastest and most powerful Fire TV ever; the first OLED Fire TV Edition smart TV; and the first Fire TV Edition smart TV with far-field Alexa voice control.
- Amazon expanded the lineup of content for Fire TV customers, including the recently announced YouTube TV app, Apple TV app, and the all-new, free News app. In the third quarter, Fire TV announced more than 37 million active users worldwide and continues to be the #1 selling streaming media player family in the U.S., the U.K., Germany, Japan, and India.
- More than 85,000 smart home products from over 9,500 unique brands can be controlled with Alexa. There are hundreds of devices with Alexa built-in, including new products from brands like Fitbit, Sonos, and Facebook. The Alexa Skills Store offers more than 100,000 skills for Alexa, including Education Technology skills made available through the new Alexa Education Skill API. Additionally, the Alexa Fund portfolio continues to expand, with new investments in startups like Drivetime.fm, SmartRent, and Labrador Systems.
- Amazon announced new Alexa smart home features and products, including the Certified for Humans program, which helps customers find hassle-free smart home products that are simple to set up and use; and the all-new voice-controlled 4-in-1 Amazon Smart Oven.
- Amazon and Discovery announced an integration that brings the new Food Network Kitchen service to Amazon devices and makes Alexa the exclusive voice service for Food Network. Customers can watch their favorite Food Network episodes, get step-by-step cooking instructions, save recipes, ask questions, and take live and on-demand cooking classes with Food Network chefs using Echo Show.
- Alexa continues to get smarter and make customers' lives easier with new features, including optional auto-deletion of voice recordings, Show and Tell, Frustration Detection, political campaign donations, Alexa Guest Connect, Drop In everywhere, Alexa Connections, and photo sharing.
- Alexa has a more natural sounding and higher-quality voice with Amazon's Neural Text-to-Speech (NTTS) technology. She can now adapt her speaking style and will soon offer her first celebrity voice, from the

CONTINUED

## Voice Assistants are Maturing Rapidly



CONTINUED

## Integrating Voice Assistants into Hearing Aids

Amazon introduces the Amazon Mobile Accessory Kit (AMAK)



- “With the Alexa Mobile Accessory Kit, OEM development teams no longer need to perform the bulk of the coding for their Alexa integration. Bluetooth audio-capable devices built with this new kit can connect directly to the [Alexa Voice Service \(AVS\)](#) via the Amazon Alexa App (for Android and iOS) on the customer’s mobile device.” – Gagan Luthara, Amazon Senior Product Manager

CONTINUED

## Voice Assistants + Hearables



## How to Kill a Negative Stigma: The Transformation into a Life-Saving Device

## The Longevity Economy



**Silver Tsunami:**  
 From 2011- 2030, 10,000 Baby Boomers will  
 turn 65 years old each day (Pew Research)

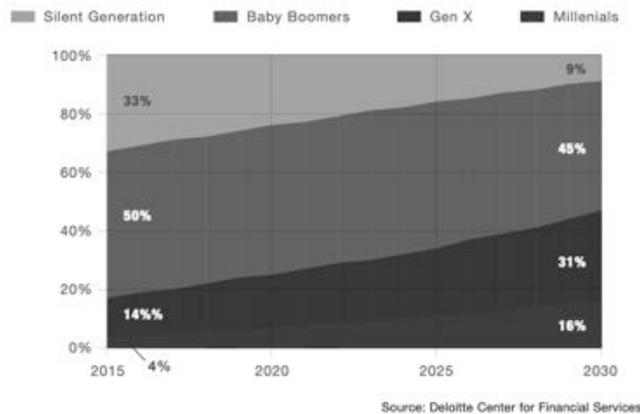


Source: U.S. Census — % of the 13+ Individuals

CONTINUED

## Longevity Economy:

Baby Boomers control about 50% of the total wealth in the US



CONTINUED

## Biometric Sensor Integration in Hearables

- Accelerometers & Gyroscopes
  - Fitness Tracking
  - Fall Detection
- PPG Sensors
  - Heart Rate
  - Heart Rate Variability
  - \*NEW\* Blood Pressure – Beginning This Year
- EKG – Not There Yet, but Soon
  - Heart Irregularities – Atrial Fibrillation

CONTINUED

## Why The Ear is Ideal for Recording Biometrics

- Unique physiology – mostly cartilage
- Most Biometrics on Body – tympanic membrane
- Exposed to the environment at all times
- Existing Use Cases/High Compliance

### Apple Watch may have saved yet another person's life | C...

<https://www.cultofmac.com/apple-watch-saves-another-life> ▼

Apple Watch may have saved yet another person's life. The Apple Watch's heart rate sensor may have saved a 76-year-old man's life. Despite feeling fine, D'Aquino discovered that two of his three coronary arteries were blocked, while the remaining one was only functioning at 10 percent of its usual capacity.



### An Apple Watch told a 46-year-old man he had an irregul...

<https://abcnews.go.com/Health/story>

Dec 11, 2018 - Ed Dentel wasn't expecting an Apple Watch update to potentially save his life.



### Dad claims Apple Watch detected serious heart conditio...

<https://www.foxnews.com/health/apple-watch-saves-man-life>...

Sep 30, 2019 - A British dad says his smartwatch detected a potentially fatal heart condition – and ultimately saved his life.



### Sure, Apple Watch saved my life. But it could do so much...

<https://www.zdnet.com/article/sure-apple-watch-saved-my-li>...

Jul 19, 2019 - My Apple Watch saved my life, and it gives me significant additional peace of mind. I should be extremely grateful for this technology – and I am ...

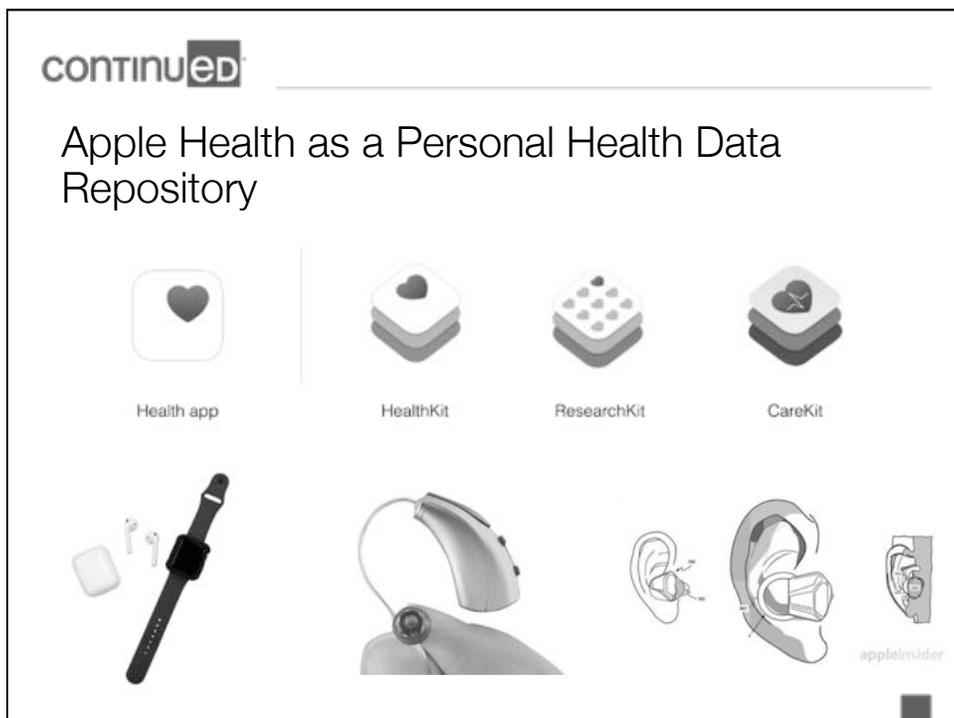
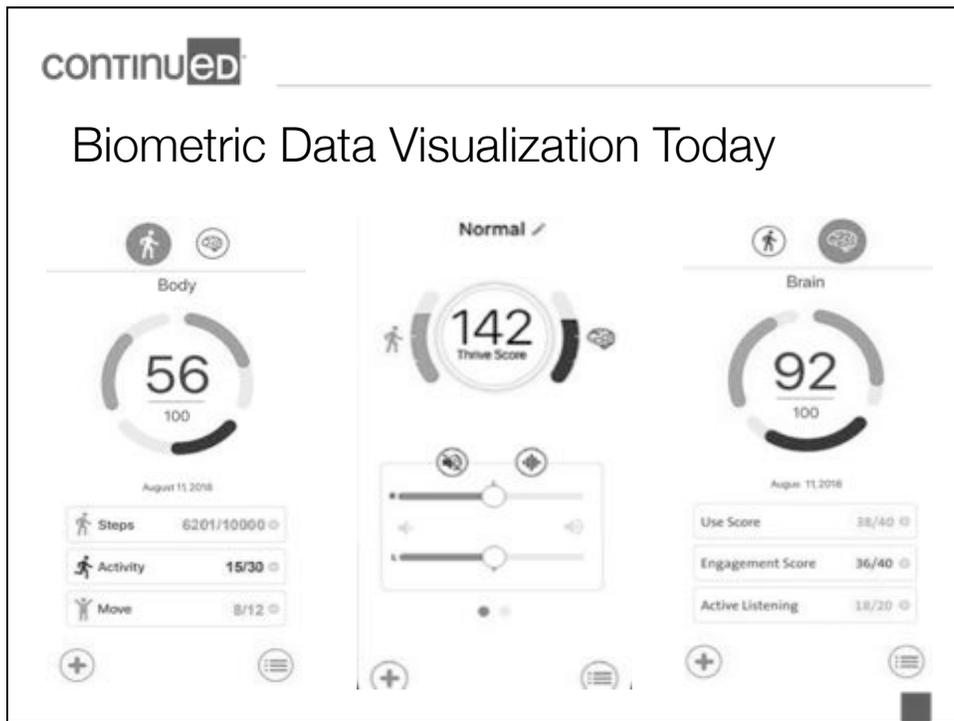


### Man's Apple Watch saves his life by alerting him to deadl...

<https://www.thesun.co.uk/news/mans-life-saved-apple-watch-d>...

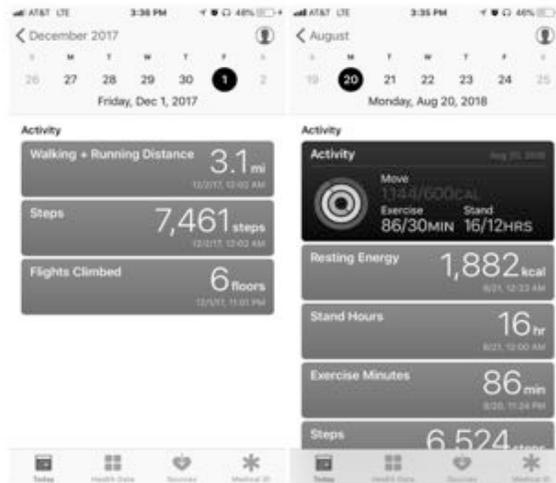
Jul 15, 2019 - A MAN'S life was saved when his Apple Watch alerted him to a







## Apple Health as a Personal Health Data Repository



## Empower your patients with Health Records on iPhone.

The Health app makes it easier than ever for users to visualize and securely store their health records. Now your patients can aggregate their health records from multiple institutions alongside their patient-generated data, creating a more holistic view of their health.



CONTINUED

Connecting Wearable Data to Broader Personal Health Records

## Fitbit will supply 'free' trackers to Singapore's public health program

CEO says Fitbit beat out Apple for the bid

By Sam Byford | @345triangle | Aug 22, 2019, 4:56am EDT



Image: Tech Radar

CONTINUED

## Voice Assistants + Biometrics



CONTINUED

CONTINUED

In Summary: Today's Hearing Aids Represent One Solution for A Convergence of Needs



CONTINUED

A Provision of Knowledgeable Assistance



CONTINUED

CONTINUED

---

## Thank You!

- David Kemp – [Dkemp@oaktreeproducts.com](mailto:Dkemp@oaktreeproducts.com)
- Twitter: @Oaktree\_Dave
- Blog: [FuturEar.co](http://FuturEar.co)
  - I write a Daily Update on all of this type of stuff

CONTINUED